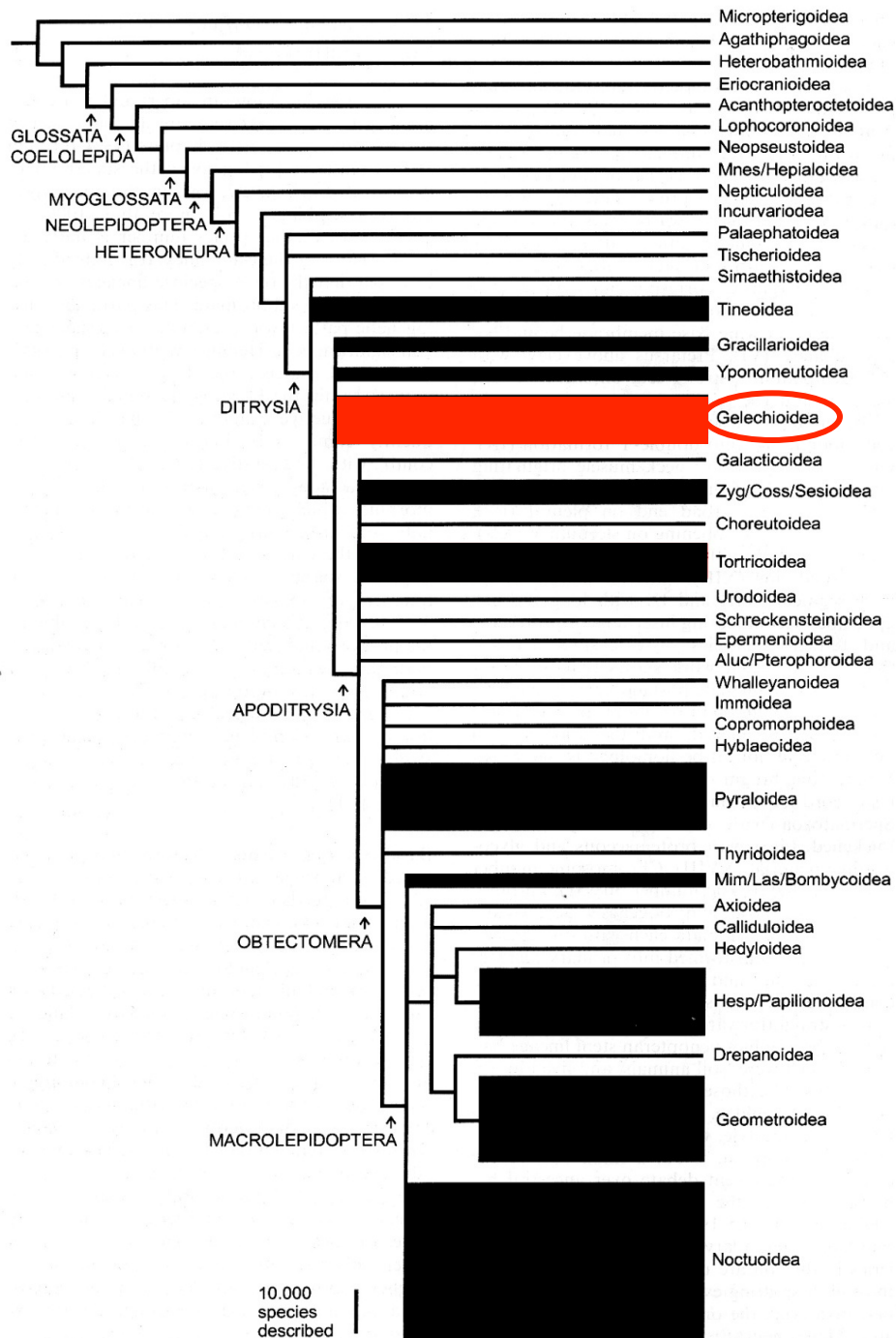


The Major Families of Gelechioidea (Lepidoptera) in North America

SWRS Lepidoptera Course 2017



Forewing length 2-35 mm

More than 16,000 described species in at least 1,425 genera worldwide

- About 1,600 species in 205 genera in America north of Mexico

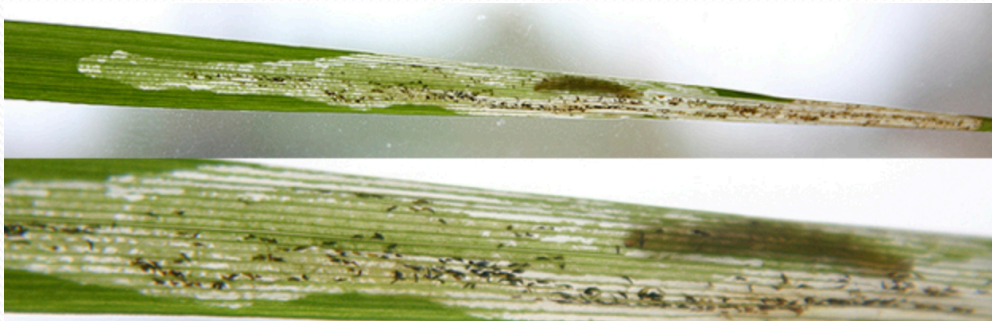
- 25% of the species diversity

(Kristensen , 1998)

Larval habits of Gelechioidea

Greatly diversified

- leaf-miners, gall-formers, seed-miners, leaf-rollers, stem-borers, flower-borers, scavengers, and case-bearers



Elachista leucofrons (Elachistidae), leaf-mining on Poaceae



Gnorimoshema baccharisella (Gelechiidae), gall-forming on Asteraceae



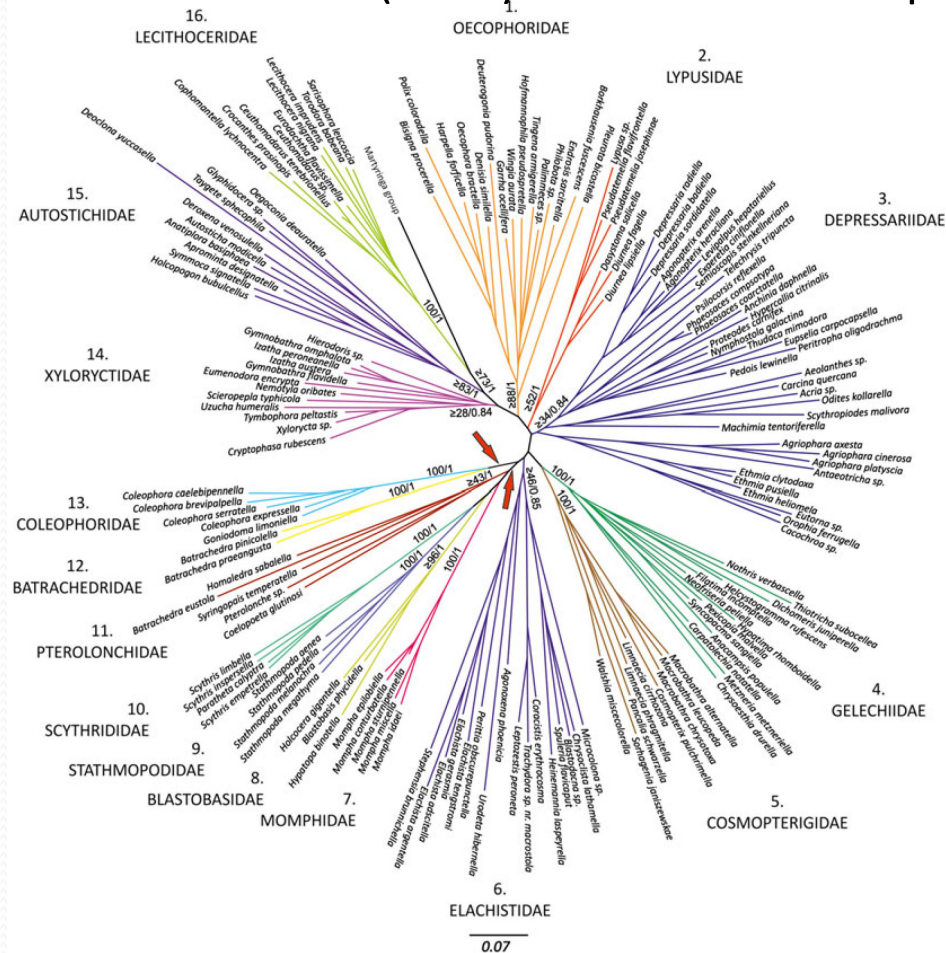
Mompha stellella (Momphidae), flower-boring on Onagraceae. Right photo: a larva exposed by opening the infested flower

Classification of Gelechioidea

- ✓ Remaining a subject of considerable debate (10-25 families?):
 - Gelechiidae, Elachistidae (Stenomatidae, Ethmiidae, Depressariidae, Agonoxenidae), Xyloryctidae (Scythrididae) Schistomeoidea, Oecophoridae (Stathmopodidae), Lypusidae, Lecithoceridae, Batrachedridae, Deocloniidae, Coleophoridae (Blastobasidae, Momphidae), Autostichidae (Symmocidae), Cosmopterigidae, others?

Classification of Gelechioidea

Heikkilä et al. (2013): Molecular + Morphological study



16 families
+ 2 families (unclear placement
: Schistonoeidae; Epimarptidae)

= 18 families of Gelechioidea
in the world

Fig. 3. Radial tree layout from maximum likelihood (ML) analysis based on combined molecular and morphological data. The terminal taxa include only ingroup taxa. Arrows indicate the position of the root in ML analyses with outgroups included. The topology in the result of the Bayesian analysis is the same as in the ML analysis. Numbers above branches represent bootstrap support values (%) and posterior probability values of respective clades from the Bayesian analysis of combined data.

Classification of Gelechioidea

Nieukerken *et al.* (2011)

Zootaxa
www.mapress.com/zootaxa/
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ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness

Nieukerken, E.J. van, et al.

Order **Lepidoptera** Linnaeus, 1758 (4 suborders) (15,578 genera, 157,424 species, 50/86)^{1, 2, 3}

† Unassigned early **lepidopterans** (4 families)

† Family **unassigned** (12 genera, 16 species, 12/16)⁴

† Family **Archaeolepididae** Whalley, 1985 (1 genus, 1 species, 1/1)²

† Family **Meokristenseniidae** Huang, Nal & Ming, 2010 (1 genus, 3 species, 1/3)⁴

† Family **Eolepidopterigidae** Fennitov, 1963 (1 genus, 1 species, 1/1)⁷

† Family **Undopterigidae** Kodov, 1988 (1 genus, 1 species, 1/1)⁸

Suborder **Zenoptera** Chapman, 1917 (1 superfamily)

Superfamily **Micropterigoidea** Hentich-Schiffer, 1855 (1 family)

Family **Micropterigidae** Hentich-Schiffer, 1855 (21 genera, 160 species, 3/6)⁹

Suborder **Aglossata** Spädel, 1977 (1 superfamily)

Superfamily **Agathiphaeidea** Kristensen, 1967 (1 family)

¹ By Erik J. van Nieukerken, Louis Kaila, Jan J. Krieger, Nilsa P. Kristensen, David C. Lees, Jøll Ming, Christian Ming, Marko Mutanen, Jerome C. Ragot, Thomas J. Simonsen, Niklas Wahlberg, Sheng-Hong Yen, Raza Zahedi, David Adamacki, Joaquin Balseiro, Daniel Banach, Bengt A. Bengtsson, John W. Brown, Sibyl Rae Buchell, Donald R. Davis, Jurgis De Prins, Willy De Prins, Marc E. Epstein, Patricia Gershi-Pool, Cees Gielis, Peter Hirschenröder, Axel Hausmann, Jeremy D. Holloway, Axel Kallies, Ole Karsholt, Akim Y. Kawahara, Sjaak (J.C.) Koster, Mikhail V. Kodov, J. Donald Lafontaine, Gerardo Lamas, Jean-François Landry, Sergio Lee, Matthias Nuss, Kyu-Tak Park, Carla Piza, Jadranka Roga, B. Christian Schmidt, Alexander Schlotterer, Joo-Chang Sohn, M. Alma Solis, Gerhard M. Tschernig, Andrew D. Warren, Susan Waller, Roman V. Yablonsky, Valérie V. Zolotareva, Andreas Zwick

² The classification largely follows that in the Handbook of Zoology (Kristensen 1998), and the later update (Kristensen et al. 2007). Recent molecular studies of Dioryina (Ragot et al. 2009; Mutanen et al. 2010) are responsible for several novelties, such as the position of the butterflies (**Rapinioidae**) and the synonymy of **Sesioidea** with **Cossacidae**.

³ When possible, numbers of genera and species are based on counts in existing databases, whether published (then cited) or personal. When not available, other for larger taxa, numbers provided by Handbook authors were updated with Zoological Record data (up to early July 2011). **Lepidoptera** (Bengtsson et al. 2005) has been an additional source.

21 families of Gelechioidea
in the world

Fifteen Families of Gelechioidea in North America

Autostichidae

Batrachedridae

Blastobasidae

Chimabachidae*

Coleophoridae

Cosmopterigidae

Gelechiidae

Momphidae

Oecophoridae

Peleopodidae

Pterolonchidae*

Scythrididae

Elachistidae

*introduced into North America

Eight Families of Gelechioidea in North America

Autostichidae

Batrachedridae

Blastobasidae

Chimabachidae

Coleophoridae

Cosmopterigidae

Gelechiidae

Momphidae

Oecophoridae

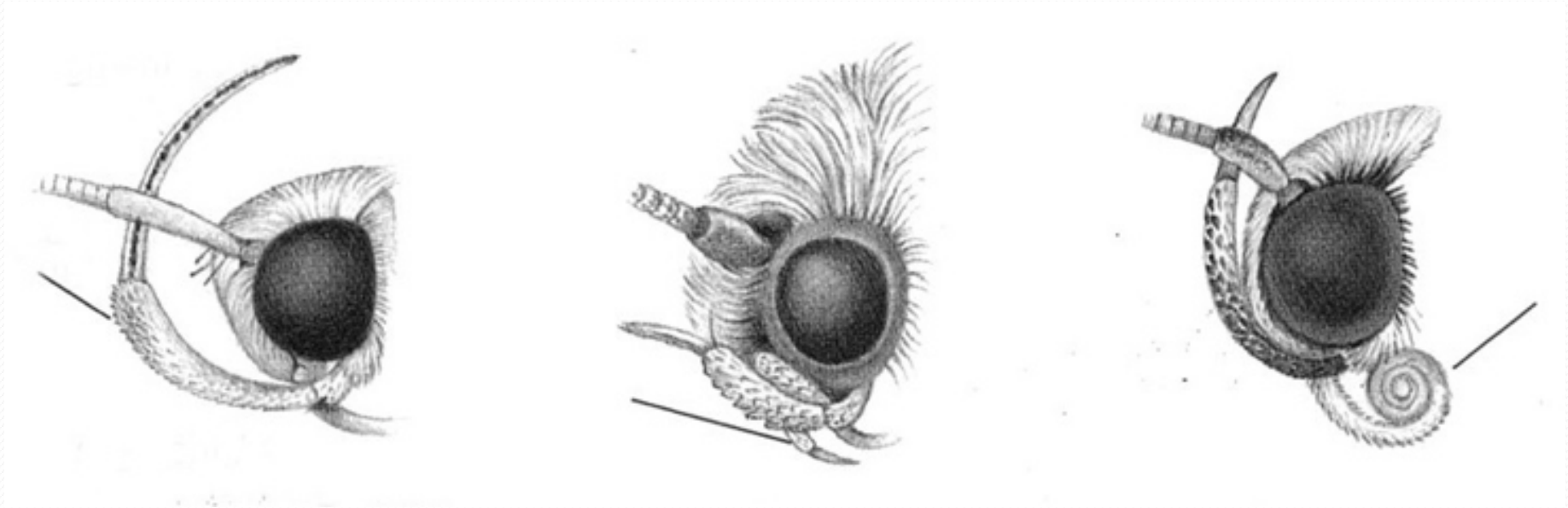
Peleopodidae

Pterolonchidae

Scythrididae

Elachistidae

Mouthparts



Labial palpus

Maxillary palpus

Proboscis

Gelechioidea

- ✓ Proboscis scaled
(also in Pyraloidea and Choreutoidea)



Gelechioidea

- ✓ Proboscis scaled
(also in Pyraloidea and Choreutoidea)
- ✓ Labial palpus three segmented,
usually strongly upcurved dorsally in
front of the head



Gelechioidea

- ✓ Chaetosemata absent (the form of setose tubercles close to the compound eyes on the head)



Chaetosemata in Tortricidae

Gelechioidea

- ✓ Hind tibia with long, slender scales on the dorsal surface



Family Blastobasidae

✓ Diversity in North America:

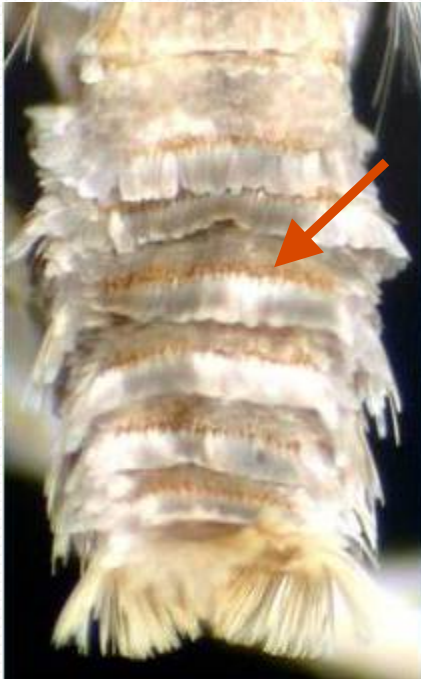
7 genera, 69 species

- uniformly dull colored, usually gray, sometimes tan or yellowish



Family Blastobasidae

- ✓ A row of bronze spiniform setae across each segment of abdomen



Family Blastobasidae

- ✓ A row of bronze spiniform setae across each segment of abdomen
- ✓ Antennae notched in males of some genera



by Terry Harrison

Family Blastobasidae

- ✓ A row of spiniform setae across each segment of abdomen
- ✓ Antennae notched in males of some genera
- ✓ Apical ends of wings with V-shaped separation at rest



by Terry Harrison

Family Coleophoridae

- ✓ Antennal pecten present



Family Coleophoridae

- ✓ Antennal pecten present
- ✓ Two patches of spiniform setae on each segment of abdomen



Family Coleophoridae

- ✓ Antennal pecten present
- ✓ Two patches of spiniform setae on each segment of abdomen
- ✓ Larvae with diverse cases



Family Coleophoridae

✓ Diversity in North America:

1 genus, 154 species

- adults superficially similar, genitalia dissections usually required for identification



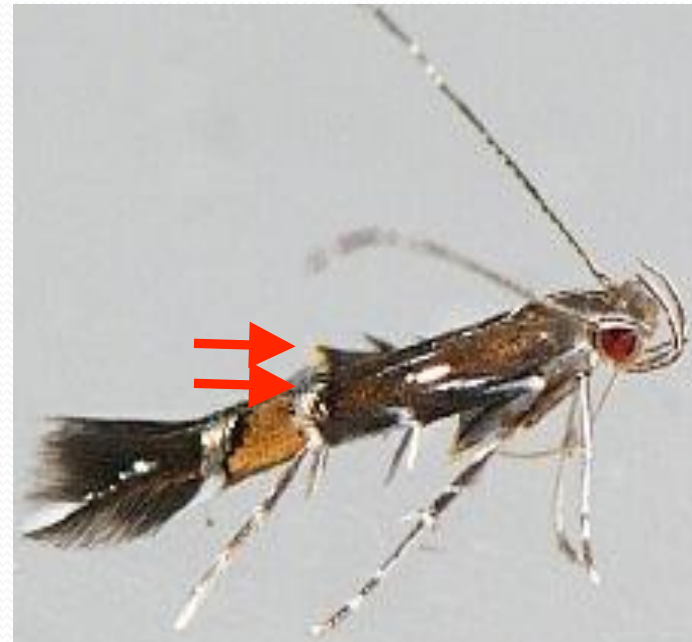
Family Cosmopterigidae

- ✓ Fore- and hindwings narrow



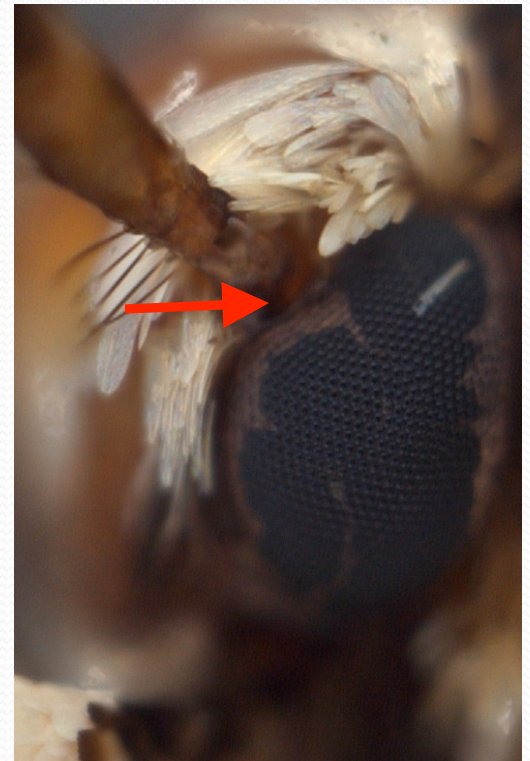
Family Cosmopterigidae

- ✓ Fore- and hindwings narrow
- ✓ Forewing often with scales forming tubercles



Family Cosmopterigidae

- ✓ Fore- and hindwings narrow
- ✓ Forewing often with scales forming tubercles
- ✓ Compound eye incised by inception of antenna



Family Cosmopterigidae

- ✓ Diversity in North America:
27 genera, 188 species



Family Elachistidae

- ✓ Maxillary palpus reduced, one- or two-segmented



Family Elachistidae

✓ Diversity in North America:

7 genera, 140 species, 5 subfamilies



Genus *Ethmia* (Elachistidae: Ethmiinae)

- ✓ Common in western states
- ✓ Forewings often with separate spots, stripes, streaks
- ✓ Family Depressariidae by Heikkilä *et al.* (2013)



Family Gelechiidae

- ✓ Hindwing usually with outer margin excavated below the apex



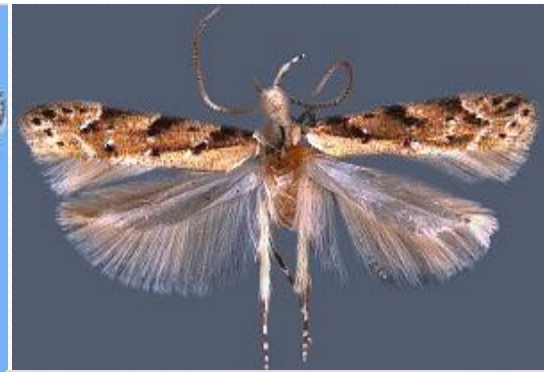
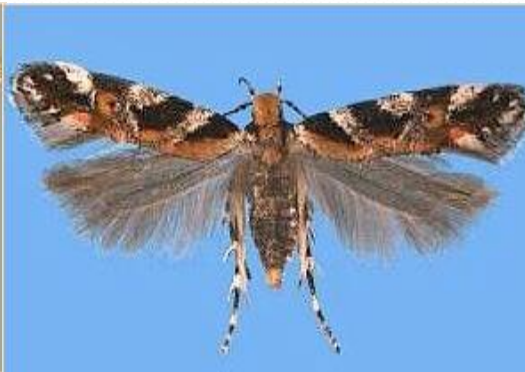
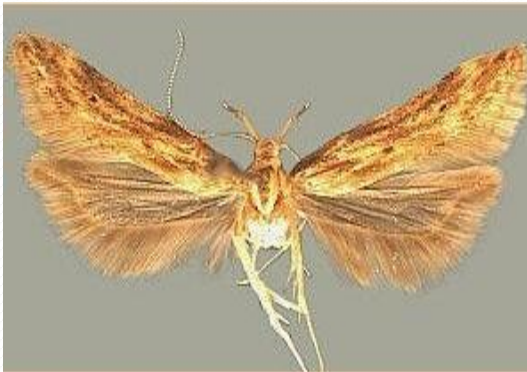
Family Gelechiidae

- ✓ Diversity in North America:
93 genera, 892 species



Family Gelechiidae

- ✓ Diversity in North America:
93 genera, 892 species



Family Momphidae

- ✓ Small, narrow-winged moths with two or more tufts of upraised scales usually on the forewing



by Terry Harrison (www.microleps.org)

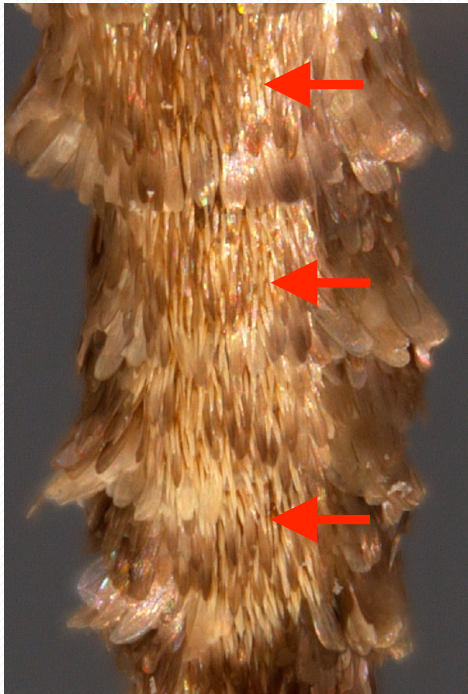
Family Momphidae

- ✓ Diversity in North America:
 - 2 genera, 46 species
 - primarily restricted to the genus *Mompha*



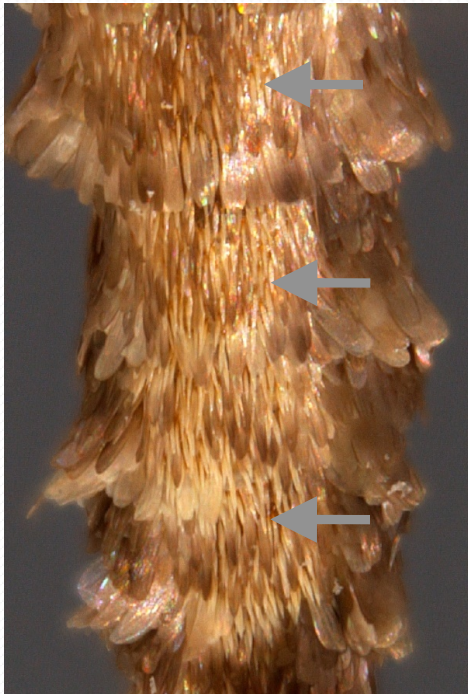
Family Oecophoridae

- ✓ Abdominal terga crossed by spiniform setae in a broad band, although absent in some genera



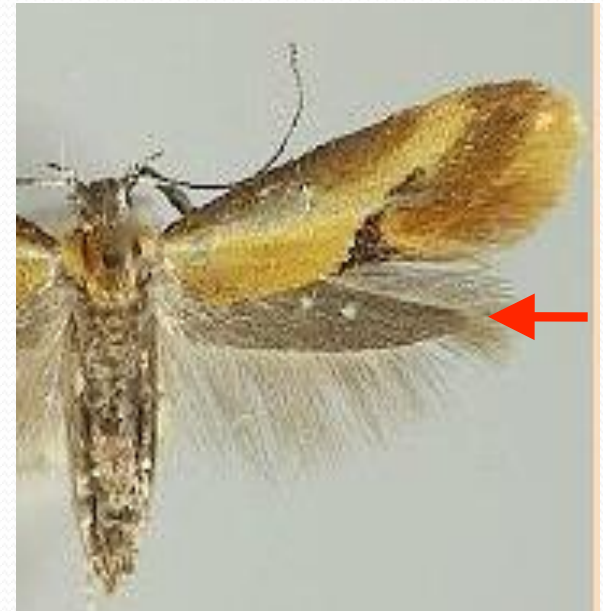
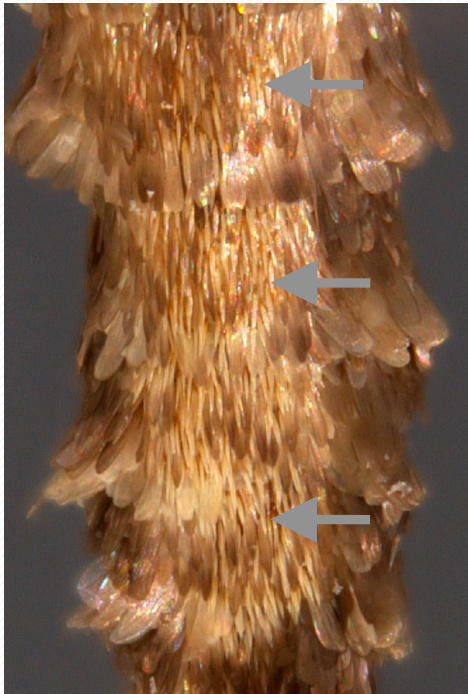
Family Oecophoridae

- ✓ Abdominal terga crossed by spiniform setae in a broad band, although absent in some genera
- ✓ Labial palpus often very long and slender



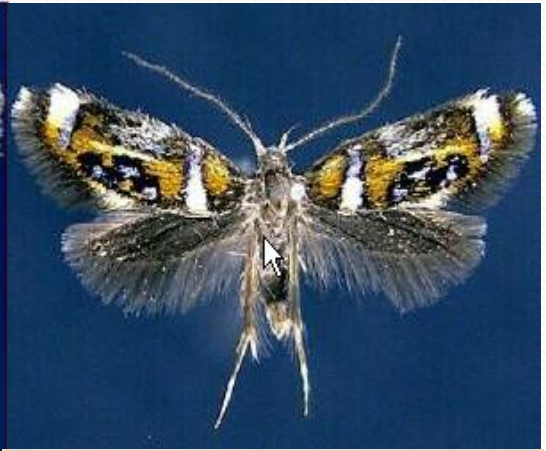
Family Oecophoridae

- ✓ Abdominal terga crossed by spiniform setae in a broad band, although absent in some genera
- ✓ Labial palpus often very long and slender
- ✓ Apex of hindwing rounded



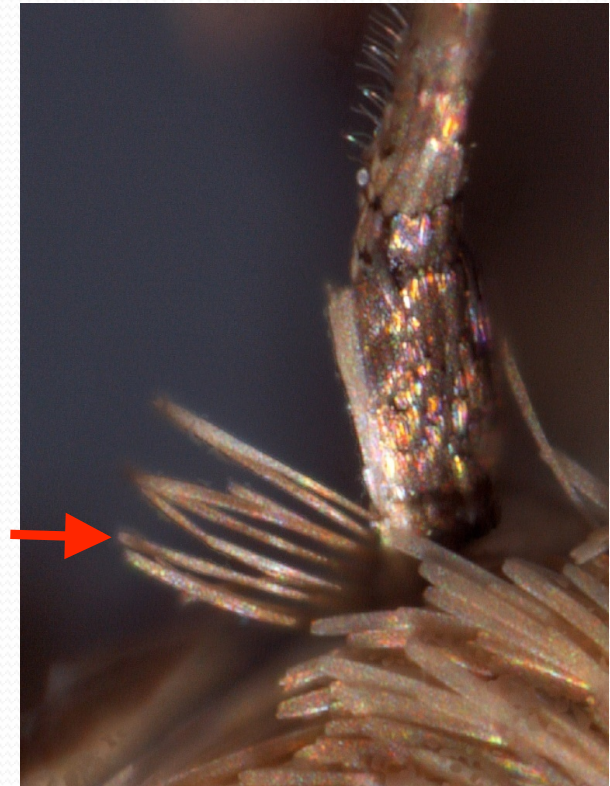
Family Oecophoridae

- ✓ Diversity in North America:
22 genera, 42 species



Family Scythrididae

- ✓ Antennal pecten present

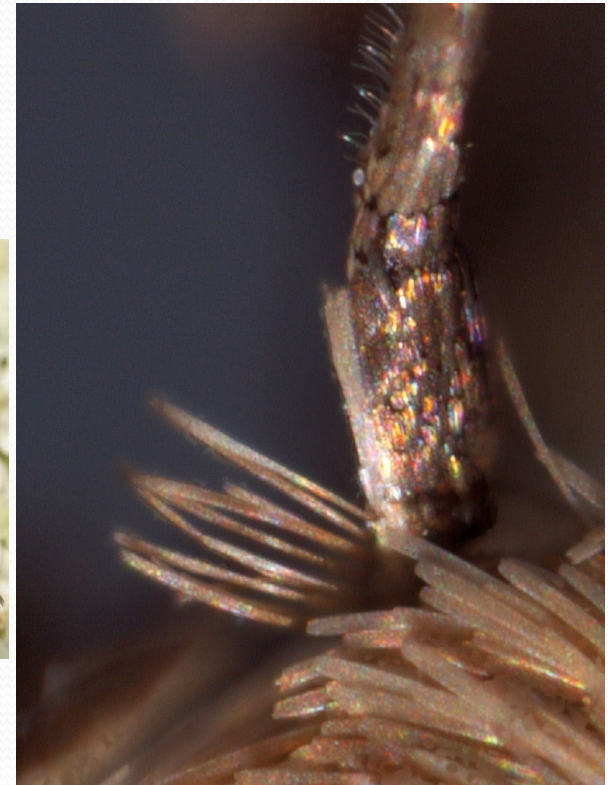


Family Scythrididae

- ✓ Antennal pecten present
- ✓ Wings teardrop-shaped at rest



Moth Photographers Group



Family Scythrididae

- ✓ Diversity in North America:
6 genera, 42 species



References

www.microleps.org

www.mothphotographersgroup.com

[http://mississippientomologicalmuseum.org.msstate.edu/
Researchtaxapages/Lepidoptera/GelechioideaFramework.htm](http://mississippientomologicalmuseum.org.msstate.edu/Researchtaxapages/Lepidoptera/GelechioideaFramework.htm)